

What is claimed is:

1. A method of making a pressure contact connector, comprising:
2 providing a rigid frame having an opening disposed therein;
4 providing a substrate of predetermined dimensions and having opposing first and
second surfaces;
6 forming a flexible body portion of the connector within said frame member by
applying an elastomer to the first and second surfaces of said substrate to cover said
surfaces such that said elastomer bonds to said substrate; and,
8 forming a plurality of conductive contacts in said flexible body portion by
inserting a plurality of thin conductive wires into said substrate in a predetermined
10 pattern, each of the contacts having opposing first and second free ends that extend past
said first and second surfaces of said flexible body portion to form a plurality of
12 conductive paths through both said substrate and said flexible body portion.
2. The method of claim 1, wherein said frame member has a thickness
2 greater than a thickness of said flexible body portion so as to define at least one
component-receiving recess on said connector.
3. The method of claim 2, wherein frame member is attached to said
2 substrate prior to insertion of said wires.
4. The method of claim 1, wherein said wires are formed from a beryllium-
2 copper alloy.
5. The method of claim 1, wherein said wires are gold-plated nickel.

6. The method of claim 1, wherein said step of forming said contacts in said
2 connector body portion includes the steps of: bending said wires upon themselves to
form lengths of double-stranded wires; inserting said double-stranded wires into said
4 flexible body portion to embed said double-stranded wires into said connector body
portion.

7. The method of claim 1, wherein said step of forming said contacts in said
2 flexible body portion includes the steps of: (A) advancing from a wire supply, a length of
wire through an insertion tool; (B) bending said wire length upon itself to form a double-
4 strand wire length; (C) inserting said double-strand wire length into said flexible body
portion to embed said double-strand wire length in said connector body portion; (D)
6 cutting said wire to free said double-strand wire length from said wire supply and define
said contact opposing first and second ends; and, (E) repeating steps (A) through (D) to
8 insert subsequent contacts into said flexible body portion.

8. The method of claim 1, wherein said wires are inserted into said substrate
2 by stitching.

9. The method of claim 6, further including the step of passing said wires
2 through a hollow insertion tool that is sequentially inserted through and removed from
said substrate and cutting said wires to define said contact opposing first and second free
4 ends thereof.

10. The method of claim 1, wherein said substrate is a woven fabric.

11. The method of claim 1, wherein said substrate is a non-woven fabric.

12. The method of claim 1, wherein said substrate is a nylon fabric.

13. The method of claim 1, wherein said substrate is a fiberglass fabric.

14. The method of claim 1, wherein said substrate is a film.

15. The method of claim 1, wherein said substrate is a polyamide film.

16. The method of claim 1, wherein said elastomer is a silicone rubber.

2 17. The method of claim 1, wherein said elastomer grips exterior surfaces of
said wires to provide a seal thereagainst.

2 18. The method of claim 1, wherein said elastomer is applied to said substrate
by dipping.

2 19. The method of claim 1, wherein said elastomer is applied to said substrate
by overmolding.

2 20. The method of claim 1, wherein said elastomer is applied to said substrate
by laminating at least one elastomer layer to said substrate.

2 21. The method of claim 7, wherein said insertion tool includes an elongated
hollow member having a central passage extending axially therethrough for
accommodating a length of wire therein, the tool including a tip end having a pair of
4 points formed thereon, the points being aligned with each other.

22. The method of claim 7, wherein said insertion tool includes an elongated
2 hollow member having a central passage extending axially therethrough for
accommodating a length of wire therein, the tool including a tip end having a truncated
4 conical configuration.

23. The method of claim 22, wherein said tip end has a bullet-like
2 configuration.

24. The method of claim 7, wherein said insertion tool includes an elongated
2 hollow member having a central passage extending axially therethrough for
accommodating a length of wire therein, the tool including a tip end having a wedge-like
4 configuration.

25. The method of claim 24, wherein said insertion tool has an elongated
2 cylindrical body enclosing said central passage, and said body is cut at an angle to form
said tip end.

26. The method of claim 1, further including the step of forming openings in
2 said flexible body portion prior to inserting said wires into said substrate.

27. The method of claim 26, further including the steps of punching holes in
2 said flexible body portion and inserting said wires in said holes.

28. The method of claim 1, wherein said elastomer has a durometer on the
2 Shore A Scale of between about 40 to about 70.

29. The method of claim 7, wherein said double strand wire length are inserted
2 into openings of said flexible body portion on opposite sides of centerlines of said
openings.

30. The method of claim 27, wherein said holes are formed in said flexible
2 body portion by using a punch to pierce said flexible body portions.

31. The method of claim 27, wherein said holes are formed in said flexible
2 body portion by using a knife to slit said flexible body portion.

32. A method of making a land grid array (LGA) connector, comprising:
2 providing a frame member having a plurality of side walls that cooperatively form
an opening within the frame member;

4 inserting a reinforcing member into said opening such that said reinforcing
member is held in registration with said opening, said reinforcing member having two
6 exposed surfaces within said opening on opposite sides of said frame member;

8 forming a flexible body portion of said connector by applying an elastomer to said
reinforcing member so as to cover substantially all of said reinforcing member two
exposed surfaces to define first and second contact-supporting surfaces of said connector
10 body portion;

12 forming a plurality of contacts in said flexible body portion in a predetermined
array wherein each contact has first and second ends that project past said body portion
first and second contact-supporting surfaces.

33. The method of making an LGA connector of claim 32, wherein said
2 contacts are inserted into said flexible body portion by stitching them into said flexible
body portion.

2 34. The method of making an LGA connector of claim 33, wherein said
4 contact-forming step includes the steps of feeding an extent of conductive wire through a
6 hollow insertion tool, bending said wire extent upon itself and forming a loop at an end of
said wire extent, thereby defining a dual strand, open loop wire contact, inserting said
insertion tool into said body portion so that the wire loop projects past one of said body
portion first and second contact-supporting surfaces and subsequently withdrawing said
insertion tool from said body portion.

2 35. The LGA connector of claim 32, wherein said contact ends project past
said body portion first and second contact-supporting surfaces a distance sufficient to
form a deformable contact embedded in said body portion.

2 36. The method of making an LGA connector of claim 32, wherein said
contact ends project past said body portion first and second contact-supporting surfaces a
distance of about 2 mm.

2 37. The method of making an LGA connector of claim 32, wherein said wires
have a circular cross-section.

2 38. The method of making an LGA connector of claim 32, wherein said wires
have a non-circular cross-section.

2 39. The method of making an LGA connector of claim 38, wherein said wires
have a rectangular cross-section.

40. The method of making an LGA connector of claim 34, further including
the step of cutting said extent of wire at a location past the other of said body portion first
and second contact-supporting surfaces, said contacts including a loop at said first end
thereof and two wire free ends at said second end thereof.

41. The method of making an LGA connector of claim 32, including the step
of providing a hollow insertion needle, extending a wire from a wire supply through said
insertion needle and extending a length of said wire, exterior of said needle; and,
inserting said insertion needle through said fabric while incrementally advancing
said wire so that portions of said wire extend past said first and second contact-supporting
surfaces and cutting said wire to form a contact in said body portion with two opposing
ends of said contacts protruding past said first and second surfaces.

42. The method of making an LGA connector of claim 32, wherein said
reinforcing member is attached to said frame member by overmolding said elastomer to
said reinforcing member and said frame member.

43. The method of making an LGA connector of claim 42, wherein said frame
member includes a plurality of anchoring cavities formed therein that form passages
extending through said frame member through which said elastomer can flow.

44. The method of making an LGA connector of claim 32, including the step
of attaching said reinforcing member to said frame member by heat staking it to said
frame member.

45. The method of making an LGA connector of claim 32, wherein each of
2 said contacts includes a length of conductive wire folded upon itself to define a first
contact end having an end loop, and a second contact end opposite said first contact end,
4 the second contact end having a pair of free ends.

46. The method of making an LGA connector of claim 41, further including
2 the steps of bending said length of wire upon itself to form an end loop in said wire, and
inserting said wire, end loop first into said flexible body portion.

47. The method of making an LGA connector of claim 32, further including
2 the step of bending said contact first and second ends of pairs of contacts toward each
other.

48. The method of making an LGA connector of claim 32, wherein said
2 reinforcing member is formed from a fabric extent.

49. The method of making an LGA connector of claim 32, wherein said
2 reinforcing member is formed from a film.

50. The method of making an LGA connector of claim 32, further including
2 the steps of forming holes in said flexible body portion and inserting said contacts into
said holes.

51. The method of making an LGA connector of claim 50, wherein a laser is
2 used to form said holes in said flexible body portion.

2 52. The method of making an LGA connector of claim 50, wherein a punch is
used to form said holes in said flexible body member.

2 53. The method of making an LGA connector of claim 49, wherein said
reinforcing member is formed from a polyamide film.

2 54. The method of making an LGA connector of claim 34, wherein each of
said dual strand wire contacts is inserted into a corresponding opening in said body
portion and said dual strands are disposed on opposite sides of associated centerlines of
4 said openings.

2 55. The method of making an LGA connector of claim 34, further including
the steps of forming openings in said body portion and partially inserting said insertion
tool into said body portion openings.

2 56. The method of making an LGA connector of claim 34, wherein said
insertion tool includes an elongated body portion encircling an interior passage, the
passage having an opening at a tip end of said insertion tool, the tip end having a
4 truncated conical configuration.

2 57. The method of making an LGA connector of claim 34, wherein said
insertion tool includes an elongated body portion encircling an interior passage, the
passage having an opening at a tip end of said insertion tool, the tip end having a wedge-
4 shaped configuration.

58. The method of making an LGA connector of claim 34, wherein said
2 insertion tool includes an elongated body portion encircling an interior passage, the
passage having an opening at a tip end of said insertion tool, the tip end having a pair of
4 points formed thereon, said interior passage opening being disposed between said points.

59. The method of making an LGA connector of claim 58, wherein said points
2 are aligned with each other.

60. The method of making an LGA connector of claim 32, when said contact-
2 forming step includes the steps of inserting previously formed contacts into openings
disposed in said connector body parts.

61. A method of making a contact connector, comprising:
2 providing a rigid frame having a first opening and a plurality of anchor cavities
disposed therein;
4 forming a flexible body portion in said frame member by overmolding an
elastomer in said frame opening and in said anchor cavities so that said elastomer bonds
6 to said frame member; and,
inserting a plurality of redundant contacts into said body portion in a
8 predetermined pattern, each contact being formed from a length of wire folded upon itself
and having opposing first and second ends that extend past first and second surfaces of
10 said flexible body portion, said contacts having first ends that extend past said flexible
body portion first surface and second ends that extend past said flexible body portion
second surface.